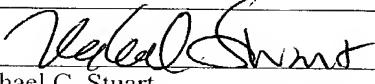


FORM PTO-1390 (REV 10-94)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		DOCKET #: 4925-190PUS
<b>TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371</b>				<b>10/018503</b>
				U.S. APPLICATION NO. (If known, see 37 CFR 1.5)
INTERNATIONAL APPLICATION NO <b>PCT/EP99/04625</b>		INTERNATIONAL FILING DATE <b>02 July 1999</b>		PRIORITY DATE CLAIMED <b>02 July 1999</b>
TITLE OF INVENTION <b>Authentication Method and System</b>				
APPLICANT(S) FOR DO/EO/US <b>Timo VITIKAINEN</b>				
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:				
<ol style="list-style-type: none"> <li><input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li><input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371</li> <li><input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).</li> <li><input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</li> <li><input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ul style="list-style-type: none"> <li>a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</li> <li>b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau.</li> <li>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US)</li> </ul> </li> <li><input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</li> <li><input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ul style="list-style-type: none"> <li>a. <input checked="" type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). (See Reply to Written Opinion)</li> <li>b. <input type="checkbox"/> have been transmitted by the International Bureau.</li> <li>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li>d. <input type="checkbox"/> have not been made and will not be made.</li> </ul> </li> <li><input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li><input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). <b>Unexecuted</b></li> <li><input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol>				
<b>Items 11. to 16. Below concern other document(s) or information included:</b>				
11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included 13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input checked="" type="checkbox"/> Other items or information ( <i>specify</i> ). PCT Publication Sheet, Int'l Preliminary Examination Report, PCT Request, Written Opinion, Reply to Written Opinion, Information Concerning Elected Offices Notified of Their Election, Notice Informing the Applicant of the Communication of the International Application to the Designated Offices, Notice of the Recording of a Change, and Notification of Receipt of Record Copy				

U.S. APPLICATION NO. (If known, see 17 CFR 1.17)	10/018503	INTERNATIONAL APPLICATION NO PCT/EP99/04625	ATTORNEY'S DOCKET NUMBER 4925-190PUS
17. [x] The following fees are submitted:			
<b>Basic National Fee (37 CFR 1.492(a)(1)-(5)):</b> Search Report has been prepared by the EPO or JPO ..... \$890.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) .. \$710.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) ..... \$740.00 Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$1040.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) ..... \$100.00			
ENTER APPROPRIATE BASIC FEE AMOUNT =			\$ 890
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).			
Claims	Number Filed	Number Extra	Rate
Total Claims	43 - 20 =	23	x \$18.00
Independent Claims	3 - 3 =	0	x \$84.00
Multiple dependent claim(s) (if applicable)		+ \$280.00	
TOTAL OF ABOVE CALCULATIONS =			\$ 1304
Reduction of $\frac{1}{2}$ for filing by small entity, if applicable.			
SUBTOTAL =			\$ 1304
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			
TOTAL NATIONAL FEE =			\$ 1304
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by the appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property			
TOTAL FEES ENCLOSED			\$ 1304
Amount to be refunded:			\$
charged:			\$
a. [x] One check in the amount of <u>\$ 1304</u> to cover the above fee is enclosed. b. [ ] Please charge my Deposit Account No. <u>03-2412</u> in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. [x] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>03-2412</u> . A duplicate copy of this sheet is enclosed.			
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>			
SEND ALL CORRESPONDENCE TO <u>Michael C. Stuart</u> Cohen, Pontani, Lieberman & Pavane 551 Fifth Avenue, Suite 1210 New York, New York 10176		 <u>Michael C. Stuart</u> Registration Number: 35.698 December 13, 2001 Tel: (212) 687-2770	

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Attorney Docket # 4925-190PUS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Phase PCT Application of

Timo VITIKAINEN

International Appln. No.: PCT/EP99/04625

International Filing Date: 02 July 1999

For: Authentication Method and System

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents

Washington, D.C. 20231

BOX PCT

SIR:

Prior to examination of the above-identified application please amend the application as follows:

In the Specification:

Page 3, after line 19, insert the following as a new paragraph:

--Other objects and features of the present invention will become apparent from the following detailed description considered in conjunction with the accompanying drawings. It is to be understood, however, that the drawings are intended solely for purposes of illustration and not as

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a definition of the limits of the invention, for which reference should be made to the appended claims.--.

On page 12, after line 10 (last line), insert the following as a new paragraph:

--Thus, while there have been shown and described and pointed out fundamental novel features of the present invention as applied to a preferred embodiment thereof, it will be understood that various omissions and substitutions and changes in the form and details of the devices described and illustrated, and in their operation, and of the methods described may be made by those skilled in the art without departing from the spirit of the present invention. For example, it is expressly intended that all combinations of those elements and/or method steps which perform substantially the same function in substantially the same way to achieve the same results are within the scope of the invention. Substitutions of elements from one described embodiment to another are also fully intended and contemplated. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.--.

On page 13, line 1, delete "Claims", and insert therefor --What is claimed is:--.

In the Claims:

Amend claims 3,4, 8, 9, 12, 13, 14 and 15 to read as follows:

3. An authentication method according to claim 1, wherein said subscriber identity is at least one of an IMSI and an MSISDN of the subscriber.

4. An authentication method according to claim 1, wherein said mapping information is transmitted in an access request message.

8. An authentication method according to claim 1, wherein said mapping information is generated by an authentication client functionality in a GGSN.

9. An authentication method according to claim 1, wherein said mapping information is used for at least one of a service specific charging and addressing of mobile terminals.

12. An authentication system according to claim 10, wherein said authentication client means (52) is a RADIUS client.

13. An authentication system according to claim 10, wherein said server (8) is a RADIUS server.

14. An authentication system according to claim 10, wherein said subscriber identity is an IMSI or an MSISDN.

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15. An authentication system according to claim 10, wherein said authentication client means (52) is arranged to transmit said mapping information in an access request message to said authentication server (8).

Add the following new claims:

18. An authentication method according to claim 2, wherein said subscriber identity is at least one of an IMSI and an MSISDN of the subscriber.

19. An authentication method according to claim 2, wherein said mapping information is transmitted in an access request message.

20. An authentication method according to claim 3, wherein said mapping information is transmitted in an access request message.

21. An authentication method according to claim 2, wherein said mapping information is generated by an authentication client functionality in a GGSN.

22. An authentication method according to claim 3, wherein said mapping information is generated by an authentication client functionality in a GGSN.

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23. An authentication method according to claim 4, wherein said mapping information is generated by an authentication client functionality in a GGSN.
24. An authentication method according to claim 5, wherein said mapping information is generated by an authentication client functionality in a GGSN.
25. An authentication method according to claim 6, wherein said mapping information is generated by an authentication client functionality in a GGSN.
26. An authentication method according to claim 7, wherein said mapping information is generated by an authentication client functionality in a GGSN.
27. An authentication method according to claim 2, wherein said mapping information is used for at least one of a service specific charging and addressing of mobile terminals.
28. An authentication method according to claim 3, wherein said mapping information is used for at least one of a service specific charging and addressing of mobile terminals.
29. An authentication method according to claim 4, wherein said mapping information is used for at least one of a service specific charging and addressing of mobile terminals.

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30. An authentication method according to claim 5, wherein said mapping information is used for at least one of a service specific charging and addressing of mobile terminals.

31. An authentication method according to claim 6, wherein said mapping information is used for at least one of a service specific charging and addressing of mobile terminals.

32. An authentication method according to claim 7, wherein said mapping information is used for at least one of a service specific charging and addressing of mobile terminals.

33. An authentication method according to claim 8, wherein said mapping information is used for at least one of a service specific charging and addressing of mobile terminals.

34. An authentication system according to claim 11, wherein said authentication client means (52) is a RADIUS client.

35. An authentication system according to claim 11, wherein said server (8) is a RADIUS server.

36. An authentication system according to claim 12, wherein said server (8) is a RADIUS server.

37. An authentication system according to claim 11, wherein said subscriber identity is an IMSI or an MSISDN.

38. An authentication system according to claim 12, wherein said subscriber identity is an IMSI or an MSISDN.

39. An authentication system according to claim 13, wherein said subscriber identity is an IMSI or an MSISDN.

40. An authentication system according to claim 11, wherein said authentication client means (52) is arranged to transmit said mapping information in an access request message to said authentication server (8).

41. An authentication system according to claim 12, wherein said authentication client means (52) is arranged to transmit said mapping information in an access request message to said authentication server (8).

42. An authentication system according to claim 13, wherein said authentication client means (52) is arranged to transmit said mapping information in an access request message to said authentication server (8).

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43. An authentication system according to claim 14, wherein said authentication client means (52) is arranged to transmit said mapping information in an access request message to said authentication server (8).

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**REMARKS**

This preliminary amendment is presented to place the application in proper form for examination and to eliminate multiple dependency from the present claims. No new matter has been added. Early examination and favorable consideration of the above-identified application is earnestly solicited.

Any additional fees or charges required at this time in connection with the application may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,  
COHEN, PONTANI, LIEBERMAN & PAVANE

By:



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13 December 2001

By Express Mail # EV052763096US December 13, 2001

**AMENDMENTS TO THE SPECIFICATION AND CLAIMS SHOWING CHANGES**

**In the Claims:**

3. An authentication method according to claim 1 [or 2], wherein said subscriber identity is at least one of an IMSI [and/or] and an MSISDN of the subscriber.

4. An authentication method according to claim 1 [any one of claims 1 to 3], wherein said mapping information is transmitted in an access request message.

8. An authentication method according to claim 1 [any one of the preceding claims], wherein said mapping information is generated by an authentication client functionality in a GGSN.

9. An authentication method according to claim 1 [any one of the preceding claims], wherein said mapping information is used for at least one of a service specific charging [and/or] and addressing of mobile terminals.

12. An authentication system according to claim 10 [or 11], wherein said authentication client means (52) is a RADIUS client.

13. An authentication system according to claim 10 [any one of claims 10 to 12], wherein said server (8) is a RADIUS server.

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14. An authentication system according to claim 10 [any one of claims 10 to 13], wherein said subscriber identity is an IMSI or an MSISDN.

15. An authentication system according to claim 10 [any one of claims 10 to 14], wherein said authentication client means (52) is arranged to transmit said mapping information in an access request message to said authentication server (8).

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**Authentication method and system**FIELD OF THE INVENTION

5 The present invention relates to an authentication method and system for identifying a subscriber of a first network in a second network.

BACKGROUND OF THE INVENTION

10

In a GPRS (General Packet Radio Services) system, a packet mode technique is used to transfer high-speed and low-speed data and signaling in an efficient manner. GPRS optimizes the use of network and radio resources. Applications based 15 on standard data protocols are supported, and interworking is defined with IP-networks. GPRS is designed to support from intermittent and bursty data transfers through to occasional transmission of large volumes of data. Charging is typically based on the amount of data transferred.

20

GPRS introduces two new network nodes in the GSM mobile network. The Serving GPRS Support Node (SGSN) which is at the same hierarchical level as a mobile switching center (MSC) and which keeps track of the individual location of 25 mobile stations (MS) and performs security functions and access control. The SGSN is connected to the base station system with a Frame Relay. The Gateway GSN (GGSN) provides interworking with external packet-switched networks, and is connected with SGSNs via an IP-based GPRS backbone network.

30

A HLR (Home Location Register) of the GSM system is enhanced with GPRS subscriber information, and a VLR (Visitor Location Register) can be enhanced for more efficient coordination of GPRS and non-GPRS services and functionality, e.g. paging for circuit switched calls that

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can be performed more efficiently via the SGSN, and combined GPRS and non-GPRS location updates.

In order to access the GPRS services, an MS first makes its  
5 presence known to the network by performing a GPRS attach. This operation establishes a logical link between the MS and SGSN, and makes the MS available for paging via the SGSN, and notification of incoming GPRS data. In order to send and receive GPRS data, the MS shall activate the  
10 packet data address it wants to use. This operation makes the MS known in the corresponding GGSN and interworking with external data networks can commence. User data is transferred transparently between the MS and the external data networks with a method known as encapsulating and  
15 tunneling, wherein data packets are equipped with GPRS-specific protocol information and transferred between the MS and the GGSN. This transparent transfer method lessens the requirement for the GPRS mobile network to interpret external data protocols, and it enables easy introduction  
20 of additional interworking protocols in the future.

In case a mobile subscriber wishes to access a value added service (VAS) provided by an IP network, a service specific charging is a mandatory feature of the corresponding VAS  
25 platform for mobile operators. This means that operators need service platforms which are capable of performing charging based on e.g. an accessed WML content or URL (Uniform Resource Locator) and delivered messages. However, MS identification in VAS platforms connected to the GPRS  
30 network or other mobile packet switched networks is not trivial. The reason therefore is that a VAS platform receives only IP packets from a certain source address which is normally only a dynamic IP address of an MS and thus not sufficient at all for identifying that MS.

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Furthermore, an MSISDN (Mobile Station ISDN number) is required which is especially important for messaging services (e.g. multimedia messaging) in order to prevent additional HLR queries.

5

A known MS identification is performed e.g. by using user names, passwords or cryptographic keys. However, these types of solutions are complex to operate/manage for mobile operators. Moreover, such solutions normally require their 10 own management systems and data bases which are not necessarily consistent with existing billing or charging systems of mobile operators where the IMSI (International Mobile Subscriber Identity) or the MSISDN are the key of the CDRs (Call Detail Records).

15

Alternatively, an authentication service could be performed in the HLR. However, this solution leads to a significant rise of the load in the HLR which is already a crucial node.

20

#### SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an authentication method and system, by means of 25 which VAS platforms may identify an MS accessing services of the VAS platform.

This object is achieved by an authentication method for identifying a subscriber of a first network in a second 30 network, comprising the steps of:  
allocating an address of said second network to said subscriber;

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generating information about a mapping between the subscriber's address in said second network and a subscriber identity; and  
transmitting the mapping to said second network.

5

Furthermore, the above object is achieved by Authentication system for identifying a subscriber of a first network in a second network, comprising:

10 a gateway device comprising allocation means for allocating an address of said second network to said subscriber, and authentication client means for generating an information about a mapping between said address of said second network and a subscriber identity, and for transmitting said mapping information to said second network; and  
15 an authentication server provided in said second network and adapted to log and maintain said mapping information.

Furthermore, the above object is achieved by a gateway device for connecting a first network to a second network, 20 comprising:

allocation means for allocating an address of said second network to a subscriber of said first network; and authentication client means for generating an information about a mapping between said address of said second network 25 and a subscriber identity, and for transmitting said mapping information to said IP network.

Accordingly, a mapping information between the address of the second network and the subscriber identity is generated 30 and supplied to the second network. Thereby, a client-server connection is achieved, which allows the actual subscriber identity of a dynamic address of the second network to be handled over to the second network. The

- 5 -

second network uses the mapping of the address of the second network and the subscriber identity for identifying the subscriber.

5 Since the first network, e.g. the GGSN, includes an information about the mapping between the address of the second network and the subscriber identity, new mapping data can be transmitted to the second network, if the mapping has changed.

10

Preferably, the subscriber identity is the IMSI and/or the MSISDN of the subscriber. Thereby, a multimedia messaging service may identify the recipient using the MSISDN, and the recipient may identify the message sender based on the

15 MSISDN provided by the multimedia messaging service center, such that HLR queries are no longer required. Furthermore, the MSISDN or IMSI may be used by a charging function for identifying the subscriber in order to perform a service specific charging.

20

The mapping information may be transmitted in an access request message, such as a RADIUS access request message.

25 Preferably, an authentication server functionality may be provided for a VAS platform, wherein the access request message is transmitted to the authentication server functionality of the VAS platform, and the mobile terminal is identified in the VAS platform based on the mapping information. In this case, the authentication server functionality may be included in the VAS platform or, alternatively, the authentication server functionality may be provided by a dedicated authentication server.

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In case the gateway device is a GGSN, the mapping information may be generated by an authentication client functionality in the GGSN.

5 The mapping information may be used for a service specific charging.

The authentication server may be a RADIUS server for the VAS platform provided in the second network, wherein the  
10 VAS platform is adapted to identify the subscriber based on the mapping information.

#### BRIEF DESCRIPTION OF THE DRAWINGS

15 In the following, the present invention will be described in greater detail on the basis of a preferred embodiment with reference to the accompanying drawings, in which:

20 Fig. 1 shows a block diagram of a GPRS network connected to an IP network according to the preferred embodiment of the present invention, and

25 Fig. 2 shows an information flow and processing diagram of an access operation to the IP network, according to the preferred embodiment of the present invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

30 In the following, the preferred embodiment of the authentication method and system according to the present invention will be described on the basis of a GPRS network which is an example for a first network and an IP network which is an example for a second network.

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According to Fig. 1, a mobile terminal or mobile station (MS) 1 is radio-connected to a GSM network 2 which in turn is connected to an SGSN 3 of a GPRS backbone network. The 5 GPRS backbone network includes a charging server 4 and a GGSN 5 connected to an IP network 9, e.g. an intranet of a specific operator or the Internet.

The GGSN 5 comprises an access point unit (AP) 51 which 10 provides an access to the IP network 9 and which is arranged to allocate an IP address to an MS to be connected to the IP network 9. Furthermore, the GGSN 5 includes an authentication client unit 52 adapted to provide required parameters for an access request issued to the IP network 15 9. Moreover, the authentication client unit 52 may be arranged to clarify/specify the handling of user name and password parameters supplied to the desired VAS of the IP network 9.

20 According to an example of the preferred embodiment shown in Fig. 1, the IP network 9 is an operator's intranet backbone which comprises an address allocation server 6, e.g. a RADIUS (Remote Authentication Dial In User Service) server, a DHCP (Dynamic Host Configuration Protocol) server 25 or a DNS (Domain Name Server), or the like. The address allocation server 6 is arranged to respond to an access request from the GGSN 5 with either an access-accept or an access-reject message. Furthermore, the address allocation server 6 performs a host configuration and address 30 allocation in the IP network 9.

Additionally, the IP network 9, e.g. the operator's intranet, comprises a Value Added Service (VAS) platform 7. An example for such a VAS platform may be a Multimedia

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Messaging Center (MMSC) for delivering multimedia messages to requesting subscribers such as the MS 1. Moreover, another example for a VAS platform is a Wireless Application Protocol (WAP) gateway which provides an access 5 to the World Wide Web (WWW) based on a corresponding Uniform Resource Locator (URL).

According to the preferred embodiment of the present invention, a dedicated authentication server 8 for the VAS 10 platform 7 is provided in the IP network 9. The authentication server 8 may be a RADIUS server which accepts or rejects access requests to the VAS platform 7. Furthermore, the authentication server 8 is arranged to log or store an access request or a corresponding mobile 15 subscriber identity, received from the authentication client, e.g. RADIUS client, 52 of the GGSN 5. Accordingly, the authentication client 52 of the GGSN 5 communicates with the address allocation server or specific authentication server 8, such that an authentication 20 client-server connection is established.

In particular, the authentication client 52 incorporates or adds a mapping information to the access request, based on which the actual MSISDN and/or IMSI of an MS requesting a 25 service from the IP network 9 can be derived at the authentication server 8. The mapping information may comprise the current IP address, the MSISDN and/or the IMSI, or any combination or shortened version, based on which the MSISDN and/or IMSI can be derived from the 30 current IP address. The MSISDN can be obtained by the GGSN 5 via the SGSN 3 from GSM network 2.

Thus, the authentication client unit 52 of the GGSN 5 provides an information about the mapping between the IP

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Fig. 2 shows an information flow and processing diagram indicating the signaling and processing actions performed during the exemplary access operation. According to Fig. 2, the MS 1 sends an Activate PDP Context Request message to the SGSN 3, including protocol configuration options and parameters such as an NSAPI (Network layer Service Access Point Identifier). Then, the SGSN 3 creates a TID for the requested PDP context by combining the IMSI stored in the MM (Mobility Management) context with the MSAPI received from the MS, wherein the SGSN fetches the MSISDN from the HLR. Subsequently, the SGSN 3 transmits a Create PDP Context Request message to the GGSN 5 including parameters such as an APN (Access Point Name), the TID and the MSISDN. The AP unit 51 of the GGSN 5 allocates an IP address for the MS 1, and the authentication client unit 52 incorporates required parameters for the access request to the authentication server 8. In particular, the authentication client unit 52 generates mapping data indicating a mapping between the allocated IP address and the MSISDN/IMSI.

The GGSN 5 sends the access request including the IP address and the mapping data to the authentication server 8 provided for the VAS platform 7. Then, the authentication server 8 accepts or rejects the received request. Furthermore, the authentication server 8 logs the request including the IP address and the mapping data. Accordingly, the VAS platform 7 is capable of identifying the MS 1 based on the mapping data included in the access request stored in the authentication server 8.

The GGSN 5 sends back to the SGSN 3 a Create PDP Context Response message, wherein a cause value is set according to the result of the authentication, i.e. access rejected or

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address and the MSISDN and/or the IMSI. If this mapping is changed, the authentication client unit 52 sends a new mapping information to the authentication server 8 of the IP network 9. Thereby, the MSISDN and/or IMSI is always  
5 available to the VAS platform 7.

The MSISDN can be provided as an additional GTP parameter supplied from the SGSN 3 to the GGSN 5. The IMSI can be derived from the TID also supplied from the SGSN 3 to the  
10 GGSN 5.

The GGSN 5 functions as an access point of the GSM GPRS data network for interworking with the IP network 9. In this case, the GPRS network will look like any other IP  
15 network or subnetwork. The access to the IP network 9 may involve specific functions such as user authentication, users authorization, end-to-end encryption between an MS and the IP network 9, allocation of a dynamic IP address belonging to the addressing space of the IP network 9. In  
20 case of a non-transparent access to the IP network 9, the GGSN 5 takes part in the functions listed above. In particular, the MS 1 requesting access to the IP network 9 is given an address belonging to the operator addressing space. The address is given either at subscription, in  
25 which case it is a static address, or at PDP (Packet Data Protocol) context activation, in which case it is a dynamic address. This address is used for packet forwarding between the IP network 9 and the GGSN 5 and within the GGSN 5.  
30 In the following, an example for an access operation to the IP network 9 via the GPRS backbone network is described based on Fig. 2.

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accepted. Depending on the cause value received in the Create PDP Context Response message, the SGSN 3 sends either an Activate PDP Context Accept message or an Activate PDP Context Reject message to the MS 1.

5

Accordingly, by the above access procedure, the VAS platform 7 can receive the IP address, the IMSI and the MSISDN of an accessing MS, such that the addressing in the multimedia messaging service can be based on the MSISDN and 10 service specific charging is possible.

In summary, the present invention relates to an authentication method and system for identifying a subscriber of a first network in a second network, wherein 15 an address of the second network is allocated to the subscriber. An information about a mapping between the address of the second network and a subscriber identity is generated and transmitted to the second network. Thereby, an authentication server connection is provided between the 20 first network and the second network, such that the subscriber identity can be handled over to the second network. Thus, a VAS platform of the second network can receive the address of the second network and the subscriber identity of the subscriber, such that subscriber 25 accessing services of the VAS platform can be identified for charging and/or addressing purposes.

It is to be noted that the above described authentication method and system can be applied between any gateway device 30 between two networks, such as a mobile network and an IP network, or a telephone network (e.g., ISDN, PSTN) and a closed or open data network. Moreover, the authentication server 8 and authentication client unit 52 are not

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restricted to a RADIUS server and client. It is also to be noted that multiple VAS platforms, similar to or different from each other, can be attached to the second network at the same time.

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The above description of the preferred embodiment and the accompanying drawings are only intended to illustrate the present invention. The preferred embodiment of the invention may thus vary within the scope of the attaches  
10 claims.

Enclosure of September 11, 2001

PCT Patent Application No.: PCT/EP99/04625  
NOKIA NETWORKS OY  
Our ref.: WO 24660

**New claims 1 to 17**

1. An authentication method for identifying a subscriber of a first network (2) in a second network, wherein an authentication server functionality for a VAS platform is provided, comprising the steps of:
  - 5 a) allocating an address of said second network (9) to said subscriber;
  - b) generating information about a mapping between the subscriber's address in said second network (9) and a subscriber identity; and
  - 10 c) transmitting the mapping to said second network, wherein said subscriber is identified in the VAS platform based on said mapping information.
2. An authentication method according to claim 1,
  - 15 wherein said mapping information is transmitted to said second network, when said mapping between said address in said second network and the subscriber identity has changed.
- 20 3. An authentication method according to claim 1 or 2, wherein said subscriber identity is an IMSI and/or an MSISDN of the subscriber.

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4. An authentication method according to any one of claims 1 to 3, wherein said mapping information is transmitted in an access request message.
5. An authentication method according to claim 4, wherein said request access message is a RADIUS access request message.
6. An authentication method according to claim 1, wherein said authentication server functionality is included in the VAS platform.
7. An authentication method according to claim 1, wherein said authentication server functionality is provided by a dedicated authentication server.
8. An authentication method according to any one of the preceding claims, wherein said mapping information is generated by an authentication client functionality in a GGSN.
9. An authentication method according to any one of the preceding claims, wherein said mapping information is used for a service specific charging and/or addressing of mobile terminals.
10. An Authentication system for identifying a subscriber (1) of a first network (2) in a second network (9), comprising:
  - a) a gateway device (5) comprising allocation means (51) for allocating an address of said second network (9) to said subscriber (1), and authentication client means (52) for generating an information about a mapping between said address of said second network (9) and a

- 3/4 -

subscriber identity, and for transmitting said mapping information to said second network (9); and

b) an authentication server (8) provided in said second network (9) and adapted to log and maintain said mapping information

5 c) wherein said authentication server (8) is a server for a VAS platform (7) provided in said second network (9), wherein said VAS platform (7) is adapted to identify said subscriber (1) based on said mapping information.

10

11. An authentication system according to claim 10, wherein said gateway device is a GGSN (5).

12. An authentication system according to claim 10 or 11, 15 wherein said authentication client means (52) is a RADIUS client.

13. An authentication system according to any one of claims 10 to 12, wherein said authentication server (8) 20 is a RADIUS server.

14. An authentication system according to any one of claims 10 to 13, wherein said subscriber identity is an IMSI or an MSISDN.

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15. An authentication system according to any one of claims 10 to 14, wherein said authentication client means (52) is arranged to transmit said mapping information in an access request message to said authentication server (8).

30 16. A gateway device for connecting a first network (2) to a second network (9), comprising:

- 4/4 -

- a) allocation means (51) for allocating an address of said second network (9) to a subscriber (1) of said first network (2); and
- b) authentication client means (52) for generating an information about a mapping between said address of said second network (9) and a subscriber identity, and for transmitting said mapping information to said IP network (9), wherein said authentication client means (52) is a RADIUS client.

10

- 17. A gateway device according to claim 16, wherein said authentication client means (52) is arranged to transmit said mapping information in an access request message.

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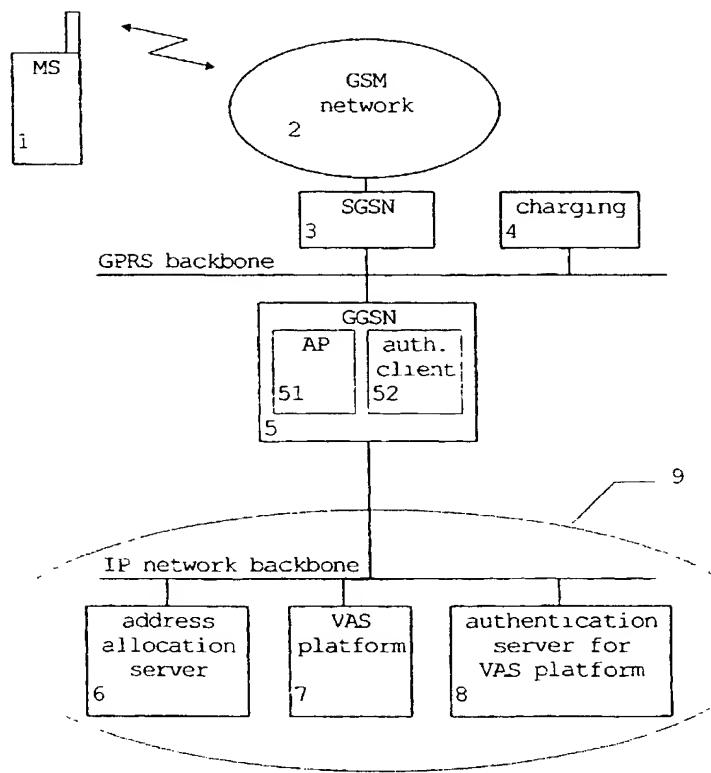
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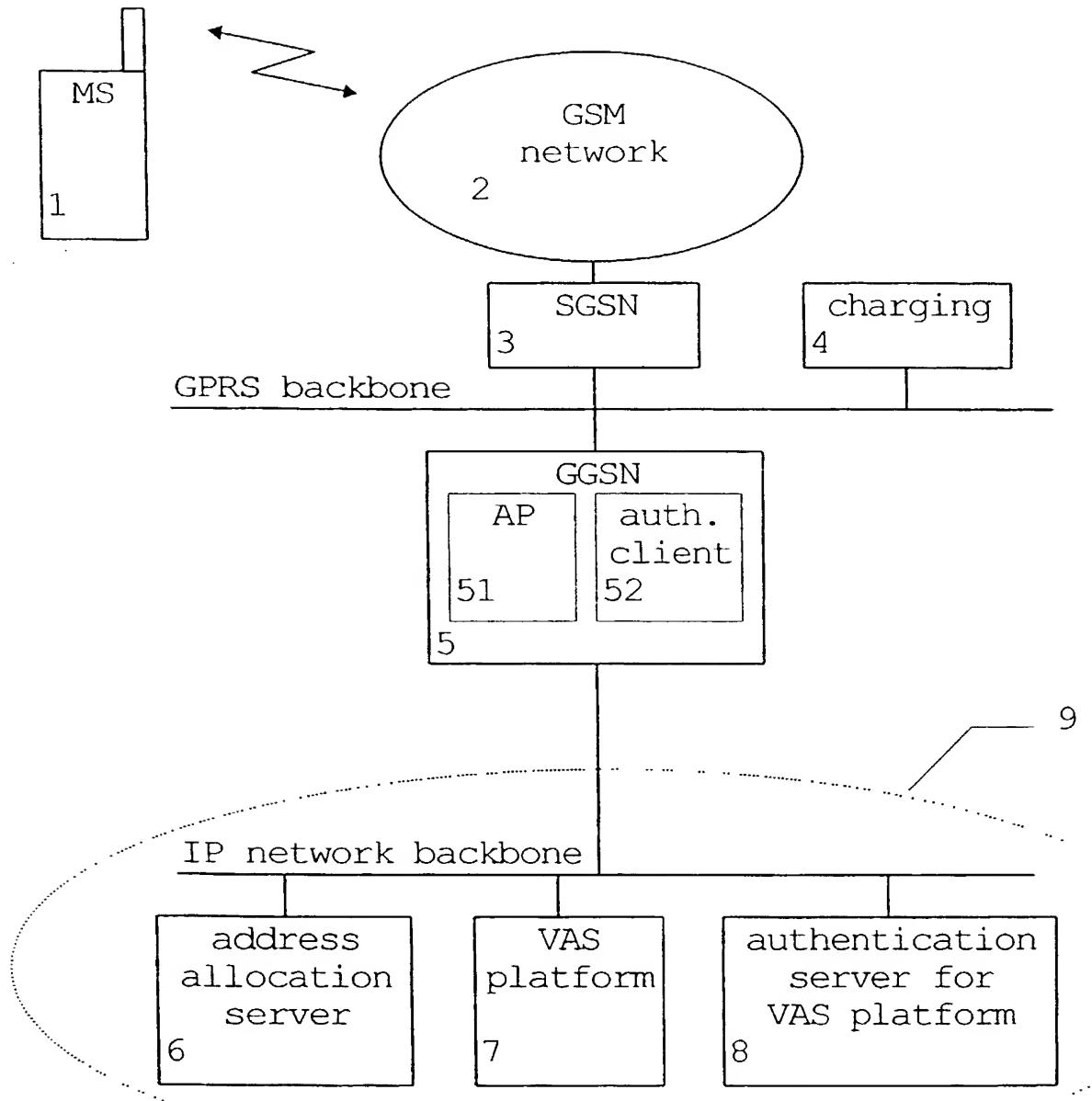
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*[Continued on next page]*

(54) Title: AUTHENTICATION METHOD AND SYSTEM



(57) Abstract: The present invention relates to an authentication method and system for identifying a subscriber (1) of a first network (2) in a second network (9), wherein an address of the second network (9) is allocated to the subscriber (1). An information about a mapping between the address of the second network (9) and a subscriber identity is generated and transmitted to the second network (9). Thereby, an authentication server connection is provided between the first network (2) and the second network (9), such that the subscriber identity can be handled over to the second network (9). Thus, a VAS platform of the second network (9) can receive the address of the second network and the subscriber identity of the subscriber (1), such that subscriber accessing services of the VAS platform can be identified for charging and/or addressing purposes.

**Fig. 1**

2 / 2

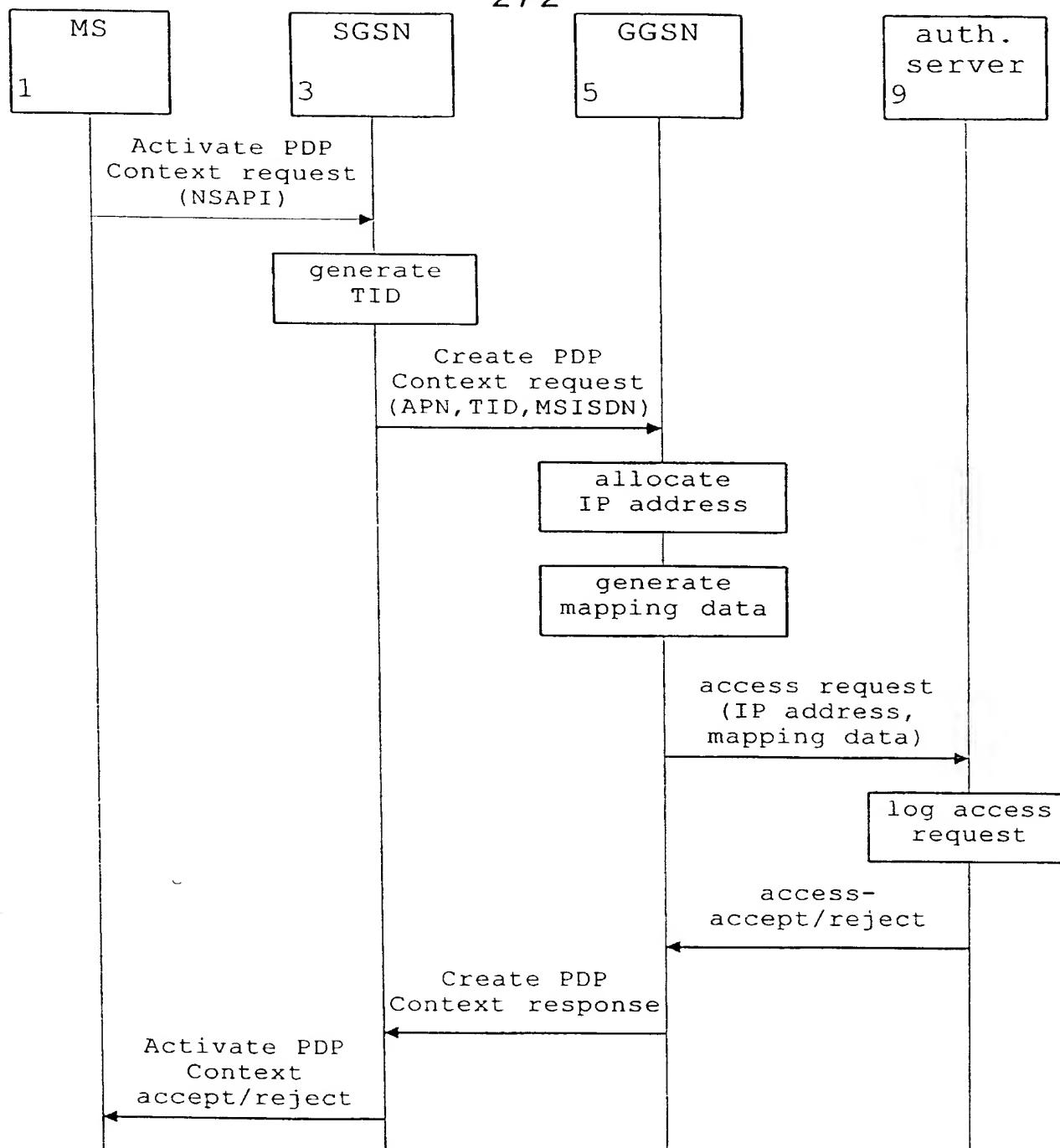


Fig. 2

**COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY**  
Includes Reference to PCT International Applications

Attorney's Docket  
No.4925-190PUS

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**AUTHENTICATION METHOD AND SYSTEM**

the specification of which (check only one item below)

is attached hereto

was filed as United States application

Serial No.   

on   

and was amended

on    (if applicable).

was filed as PCT international application

Number PCT/EP99/04625

on 02 July 1999

and was amended under PCT Article 19

on    (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of the application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

**PRIOR FOREIGN/PCT APPLICATIONS AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:**

Country (if PCT, indicate "PCT")	Application Number	Date of Filing (day, month, year)	Priority Claimed Under 35 U.S.C. 119	
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
PCT	PCT/EP99/04625	02 July 1999	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO

Combined Declaration for Patent Application and Power of Attorney (Continued) Attorney's Docket No.  
4925-190PUS

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

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PCT APPLICATIONS DESIGNATING THE U.S.				
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PCT/EP99/04625	02 July 1999		x	

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (List name and registration number)

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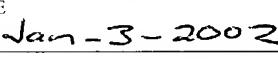
2 0 1	FULL NAME OF INVENTOR	FAMILY NAME <u>VITIKAINEN</u>	FIRST GIVEN NAME <u>Timo</u>	SECOND GIVEN NAME
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201 	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
DATE  Jan -3 - 2002	DATE	DATE